

sudden influx of steam below the piston, or the accidental breaking of a pump rod, the proportions of seven or eight to one should be observed.

#### MANUFACTURE OF SHELL CAMEOS— PRESERVATION OF SANDSTONE.

At a meeting of the Society of Arts, on 21st ultimo, Dr. Roget in the chair, Mr. Gray read a paper "On the manufacture of shell cameos, and exhibited six specimens of shells with the cameos cut upon them. The author commenced by stating that the ancients formed cameos by engraving figures in low relief on different kinds of silicious stones, and generally selected for that purpose those which had layers of different colours, so that the figures or different parts of the same figures, were of divers colours. Such cameos are now made in southern Europe, and in France, where this art has lately been attempted to be revived, but the hardness of the materials require so much labour to be employed in their fabrication, that they are too expensive to come into general use. Numerous attempts have been made to substitute various materials, such as porcelain and glass, for the ancient cameos, but their great inferiority has caused them to be neglected. The best and now most used substitutes are shells, several kinds of which afford the necessary difference of colour, and are at the same time soft enough to be worked with ease, and hard enough to resist wear. The shells now used, are those of the flesh eating univalve, which are peculiar, as being formed of three layers of calcareous matter, each layer being a perpendicular lamen, placed side by side. The cameo cutter selects these shells, which have the three layers composed of different colours, as they afford him the means of relieving his work; but the kinds now employed and which experience has taught him are best for his purpose, are,—the bull's mouth, the black helmet, the horned helmet, and the queen conch. The two first are the best shells. After detailing the peculiarities of these shells, he proceeds to give an account of the progress of the art, which was confined to Rome for upwards of forty years, and to Italy until the last twenty years, at which period, an Italian commenced the making of them in Paris, and now about 300 persons are employed in this branch of trade in that city. The number of shells used annually thirty years ago was about 300, the whole of which were sent from England, the value of each shell in Rome being 30s. To show the increase of this trade, the number of shells used in France last year was nearly as follows:—

Shell in use.	Quantity.	Average price in 1871.	Value.	Amount.
Black helmet	10,000	30s.	300,000	10,000
Horned helmet	10,000	30s.	300,000	10,000
Queen conch	10,000	30s.	300,000	10,000
Bull's mouth	10,000	30s.	300,000	10,000
Black helmet	10,000	30s.	300,000	10,000
Horned helmet	10,000	30s.	300,000	10,000
Queen conch	10,000	30s.	300,000	10,000
Bull's mouth	10,000	30s.	300,000	10,000

The average value of the large cameos made in Paris is about six francs each, giving a sterling value of 32,000*l.*, and the value of the small cameos is about 8,000*l.*, giving a total value of the cameos produced in Paris for the last year of 40,000*l.*, while in England not more than six persons are employed in this trade.

The second communication was by Mr. D. R. Hay, on a means of rendering sculptured sandstone impervious to the effects of our changeable climate and humid atmosphere.

The author first stated the nature and structure of the various sandstones, and the causes which operate upon them and separate the particles, and the plans usually resorted to for preserving masons' work from the injurious action of the air. Finding that the ordinary process of saturating the sandstone with linseed oil was ineffectual, and having occasionally used bees' wax as an ingredient in paint, and knowing from experience that it is impervious to the blanching or oxydizing influences of the common atmosphere, he considered that if applied to sandstone, it would render it very durable. I believe (observes Mr. Hay), that it has been used by the ancients in securing their fresco paintings by rubbing it upon them, and facilitating its absorption by the application of hot irons, and a similar application has been recommended in modern times in respect to sculptured marble, but such a process must be very uncertain as to its efficiency, inasmuch as the absorption must be very partial and unequal. The plan I would

recommend is applicable to statues, vases, and all sculptured architectural decorations, viz. a trough of suitable capacity must be built of brick with a furnace under it, and the trough filled with sand: placed amongst the sand at one end of the trough a vessel made of tin or copper and of the requisite capacity, into which put spirits of turpentine or naphtha and bees' wax, in the proportion of two or three pounds of the latter to a gallon of the former, according to the stone to be saturated is more or less porous. Keep the furnace going until the sand has become sufficiently hot to dissolve the wax amongst the oleaginous or bituminous spirits in the tin or copper vessel. Place the stone to be saturated in the uncovered part of the trough until it becomes of a temperature equal to that which has dissolved the wax, and if the capacity of the vessel admits, let the sculptured stone be immediately removed from the sand and dropped into the adjoining vessel, when in a few seconds it will absorb a sufficient quantity of the wax, held in solution by the spirits, to prevent the humidity of the atmosphere ever acting upon it.

An interesting discussion took place after the reading of the paper, in which Mr. Gray, Mr. Tennant, Mr. C. H. Smith, Mr. Grace, and others took part.

#### DWELLINGS FOR THE MIDDLE CLASSES.

Sir,—A great deal of attention has lately been paid to plans for providing dwellings of superior description for the labouring classes. Some of these plans display considerable architectural ability. I am inclined to think that in the neighbourhood of the metropolis, utility, beauty of design, and remuneration to the capitalists, might also be combined in a series of buildings for the accommodation of the numerous members of the middle class, whose narrow means compel them at present to reside in unfurnished apartments, or in small, ill-built, ugly, inconvenient, and high-rented tenements. It is well known, that under 40*l.* a year, it is most difficult to obtain a decent residence any where in the neighbourhood of London. By decent, I mean well-drained, solidly constructed, and with those advantages of air and water necessary for health and comfort. Now, I cannot help thinking, that if some of our young architects of talent, instead of devoting their spare time to designing fabulous palaces, impossible innuents, &c., cathedrals intended to excel St. Peter's of Rome and St. Paul's of London, were to turn their attention to the accommodation of from fifty to a hundred families, at rents varying from 20*l.* to 30*l.* a year in one building, a series of buildings of great comfort and great architectural effect might be combined. I have in my eye while writing these lines a small newsquare, situate about three miles from London, composed of nearly a hundred and fifty houses, surrounding a patch of dirt intended at some distant day to be a garden. The general design of these houses is picturesque, but they are mere lath and plaster; the floors of green wood, with scarcely a door or a window that will shut properly; lamentably deficient in drainage; damp and drafty. But they are let nearly as fast as they are finished, for the rents do not exceed 34*l.* a year; and smooth red brick with stone (?) dressings to the facades, attract young married couples. Of course, in these little two-story dwellings there is a great waste of space and material with very little privacy, for you can hear all the conversation of your next door neighbour, and the apology for a garden behind is as much exposed as the plot in front. But persons, not prepared to give more than thirty pounds a year, have no choice in London between cottages such as I have described, and unfurnished lodgings in houses not built for the purpose of accommodating separate families, and where the intermixing of the landlord and his lodgers is most unpleasant.

Now, if the capital which has been expended on the square I have described, had been devoted to one building, forming one or more sides of a quadrangle, to be completed according to demand, I think that something much more convenient might have been provided for every family at the same rent, and with a good architectural design. A plot of ground in front might have been laid out ornamentally, and

some general convenience for washing and baking provided.

The same idea has often been broached before, but it has generally been encountered by plans for congregating the tenants at meals, at lecture-rooms and ball-rooms, and other assemblies foreign to English notions of house-keeping.

The neighbourhood of London swarms with respectable married people, whose circumstances do not enable them to keep up a large establishment, and whose education, station, and feelings render the lodgings, into which they are obliged to thrust themselves, a perpetual source of misery.

I propose that a handsome building, like those in the Temple, but with more domestic conveniences, should be erected in a convenient suburb, and let out in chambers; and the first experiment might be made in the following manner,—let a builder of capital procure plans and elevation from a competent architect; and having found a suitable piece of land, announce that as soon as he had the names of a sufficient number of parties willing to rent (say thirty sets of chambers), he would commence the first block. The subscription of parties willing to engage for a year certain, would be filled up in a week. The Bank of England clerks would alone supply a score of tenants; and all the government offices a tithe of poor proud couples. Eventually, perhaps, the economy of a public kitchen and joint-stock cook might be arranged by some of the tenants on the club system.

I have thus roughly sketched out ideas suggested by the wants of my friends and neighbours, which your practical skill and architectural taste will enable you, Mr. Editor, to put into better shape.—I am, Sir, &c.,

10th April, 1877.

RUSSELL.

#### RAILWAY JOTTINGS.

At the Society of Arts, Adelphi, lately, a paper was read "On Fuller and de Burge's Vulcanized India-rubber Springs for Buffers, &c." One of these springs is said to have been subjected to the tender mercies of Nasmyth's steam-hammer, under which it received 200 blows without the least effect on its elasticity. The article is being tested on the Great Western and several other lines.—The Ashford and Hastings line, with an expected traffic of 5,000*l.* a year, will cost, it is said, 20,000*l.* a mile. The North Kent, for the first six miles out of London, will exceed the Parliamentary land estimate for the whole length. Some of the claims average 20,000*l.* an acre for land. The total land estimate for the 26 miles, with stations, was about 300,000*l.*—The Southampton and Dorchester line will be opened in the course of the present month, and will then create an entire revolution in the mail conveyance throughout the south of England.—The projected new station is about to be erected at Chester, near the site of the present offices, as a grand central terminus for the London and North-Western, the Chester and Holyhead, the Chester and Birkenhead, the Shrewsbury and Chester, and the Cheshire Junction Railways, all the lines, in fact, which concentrate in Chester. The length of the building is to be 910 feet; the centre range having two stories of great architectural pretensions, flanked by towers 40 feet high. The cost of erection will be about 100,000*l.*—The Midland Company have followed the example of the London and Birmingham, by serving notices to quit on all the carriers by rail to Lincoln.—The first stone of the Nidd viaduct on the East and West Yorkshire line, was laid on Monday week at Knaresborough.—The directors of the Dumbartonshire line have entered into a contract with Messrs. McIlquham, Forgan, and McElroy, for the erection of a viaduct bridge across the river Leven.—The foundation stone of the railway bridge over the Almond, near Perth, was laid on Tuesday week before last.

VENTILATING PANELS.—Among the last inventions to facilitate good ventilation, Mr. Bowie has recently registered a pane of glass wherein small holes are drilled obliquely, an inch or an inch and a-half apart, thus giving an upward direction to the current, with the view of avoiding inconvenience to the occupants of the apartment.